

VIDEO GRAPHICS CONTROLLER INSTALLATION GUIDE

SUBJECT

Instructions for Installing the Video Graphics Controller in a Bull PC

SPECIAL INSTRUCTIONS

This manual has been revised to the -200 level. It supersedes all previous issues.

The following notice is provided in accordance with the United States Federal Communications Commission's (FCC) regulations.

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna

- Relocate the computer with respect to the receiver

- Move the computer away from the receiver

- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the seller or an experienced radio/television technician for additional suggestions.

ORDER NUMBER

LA40-01

DOCUMENT NUMBER

71018318-200

May 1989

Bull



USER COMMENTS FORMS are included at the back of this manual. These forms are to be used to record any corrections, changes, or additions that will make this manual more useful.

This document was issued March 1989 as LA40-00 by Document Issue Notice No. BLCDJ7705.

This document was revised May 1989 as LA40-01 by Change Order No. BLCOK0301.

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IMPORTANT PC SAFETY INSTRUCTIONS

Follow these instructions to operate the product safely.

1. Read all these instructions.
2. Save these instructions for later use.
3. Follow all warnings and instructions marked on the product.
4. Unplug the PC from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
5. Do not use the PC near water.
6. Do not place the PC on an unstable cart, stand, or table. It may fall, causing serious damage to the product.
7. Slots and openings in the cabinet and the back or bottom are provided for ventilation; to ensure reliable operation of the PC and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the PC on a bed, sofa, rug, or other similar surface. The PC should never be placed near or over a radiator or heat register. The PC should not be placed in a built-in installation unless proper ventilation is provided.
8. The PC should be operated from the type of power source indicated on the marking label. If you are unsure of the type of power available, consult your Bull Representative or local power company.
9. The PC is equipped with a 3-wire grounding type plug, a plug having a third (grounding) pin. This plug fits into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.
10. Do not permit anything to rest on the power cord. Do not locate the PC where persons walk on the cord.

11. If an extension cord is used with this PC, make sure that the total of the ampere ratings of the PCs plugged into the extension cord does not exceed the extension cord ampere rating. Also, make sure that the total of all PCs plugged into the wall outlet does not exceed 15 amperes.
12. Never push objects of any kind into the PC through cabinet slots. They may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the PC.
13. Except as explained elsewhere in this manual, do not attempt to service this PC yourself. Opening or removing those covers that are marked "Do Not Remove" may expose you to dangerous voltage points or other risks. Refer all servicing in those compartments to service personnel.
14. Unplug the PC from the wall outlet, and refer servicing to qualified service personnel under the following conditions:
 - When the power cord or plug is damaged or frayed.
 - If liquid has been spilled into the PC.
 - If the PC has been exposed to rain or water.
 - If the PC does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of other controls may result in damage and often requires extensive work by a qualified technician to restore the PC to normal operation.
 - If the PC has been dropped or the cabinet has been damaged.
 - If the PC exhibits a distinct change in performance, indicating a need for service.

ABOUT THIS MANUAL

You can install the Video Graphics controller board (VGC) in a variety of Personal Computers (PCs), and use it in a variety of ways. You can install the VGC alone (with no other monitor controller boards resident), or with another co-resident monitor controller board.

This manual is organized so that you can easily refer to the information for your installation method, PC, and the way you use your VGC board.

All users should refer to:

- | | |
|------------|--|
| Section 1 | This section describes the VGC board and its capabilities. Includes specifications and system requirements. |
| Section 2 | This section tells you how to set the switches and jumpers on the VGC board. Tables list and describe the settings for each supported monitor. |
| Section 3 | This section describes how to install the VGC in your Bull or IBM PC.

For instructions on using emulation modes with your VGC board and the Screen Saver utility, refer to Section 4. |
| Section 4 | This section describes how to use the VGA.EXE program (emulation modes) and the SCR.COM program (Screen Saver) (supplied on the VGC Utilities diskette).

For reference information or diagnostic procedures for the VGC, refer to the appropriate appendix(es). |
| Appendix A | Appendix A describes troubleshooting procedures for the VGC. |
| Appendix B | Appendix B describes how to use the diagnostics program, DIAG.EXE (on your Utilities diskette), if you experience problems with your VGC. |

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Section 1

INTRODUCTION

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The Bull Video Graphics Controller (VGC), with 256 kilobytes (KB) of standard memory, is designed for compatibility with the IBM Video Graphics Array Adapter (VGA).

The VGC is compatible with the Bull VGA color or monochrome monitors.

FEATURES

The VGC provides the following features:

- In addition to its own VGA capabilities, emulates three Bull controller boards.
 - High-Resolution monochrome monitor
 - Color monitor
 - Enhanced Color monitor
- 720 by 400 monochrome text
- 720 by 348, Hercules-compatible monochrome graphics
- 256 KB on-board memory supports up to eight graphics pages in 320 by 200, 16-color mode
- RAM-based, loadable character generator, capable of up to 512 displayable character codes for multiple character fonts
- Smooth, flicker-free horizontal and vertical scrolling
- IBM VGA "Feature Adapter" compatible connector
- Designed using advanced custom chip (VLSI) technology for speed and reliability.

Controller Boards Emulated by the VGC

In addition to being compatible with the VGA monitors, the VGC emulates the following monitor controllers:

- Bull monochrome controller
- Bull Enhanced Color controller
- Bull Color Graphics Adapter (CGA)
- Hercules Graphics Card (HGC).

VGC emulation allows you to run software written for each of these boards.

NOTE: The VGC does not support composite video monochrome monitors, such as the Bull Monochrome Graphics monitor.

Installation with a Second, Co-Resident Controller Board

You can install the VGC alone, or with a second Color Graphics or High-Resolution monochrome controller board.

Refer to the installation section of this manual that applies to your type of PC (Bull or IBM) for information on installing the VGC with a co-resident controller.

Board Switch Settings

Switches located on the backplate of the VGC allow you to configure the board as follows:

- Select standard PS/2 compatible fixed frequency display timing, or special multifrequency display timing.
- Select PS/2-style VGA implementation, or PC/AT-style implementation.
- Select Autosense.
- Test and enable 16-bit memory and BIOS, if possible on your system.
- Force 8-bit memory and BIOS operation.

Once you have installed the VGC, its switches are fully accessible, allowing you to reconfigure the board, if necessary.

Refer to Section 2 for instructions on setting VGC board switches.

The VGA.EXE Emulation Program

Some software programs require a Color Graphics Controller (CGC) or Hercules Graphics Card (HGC). You can use the VGA.EXE program (located on the VGC Utilities diskette) to configure your VGC to emulate either of these controllers.

Refer to Section 4 for instructions on using the VGA.EXE program.

The Screen Saver Utility

You can use the Screen Saver utility (SCR.COM, located on the VGC Utilities diskette) to automatically shut off your screen display if you are away from your PC for long periods of time. This helps extend the life of your screen, reducing the chance of images being "burnt" into the screen.

Refer to Section 4 for instructions on using the Screen Saver utility.

Text and Graphics Capabilities

Table 1-1 shows the standard VGA video modes.

Table 1-1. Standard VGA Video Modes

Mode (hex)	Type	Colors ^a	Columns	Rows	Buffer	Char- acter Size ^b	Reso- lution ^c
0	Text	16/256K	40	25	B8000	8x8	320x200
0 ^d	Text	16/256K	40	25	B8000	8x14	320x350
0 ^e	Text	16/256K	40	25	B8000	9x16	360x400
1	Text	16/256K	40	25	B8000	8x8	320x200
1 ^d	Text	16/256K	40	25	B8000	8x14	320x350
1 ^e	Text	16/256K	40	25	B8000	9x16	360x400
2	Text	16/256K	80	25	B8000	8x8	640x200
2 ^d	Text	16/256K	80	25	B8000	8x14	640x350
2 ^e	Text	16/256K	80	25	B8000	9x16	720x400
3	Text	16/256K	80	25	B8000	8x8	640x200
3 ^d	Text	16/256K	80	25	B8000	8x14	640x350
3 ^e	Text	16/256K	80	25	B8000	9x16	720x400
4	Graphics	4	40	25	B8000	8x8	320x200
5	Graphics	4	40	25	B8000	8x8	320x200
6	Graphics	2/256K	80	25	B8000	8x8	640x200
7	Text	4	80	25	B0000	9x14	720x350
7 ^e	Text	4	80	25	B0000	9x16	720x400
D	Graphics	16/256K	40	25	A0000	8x8	320x200
E	Graphics	16/256K	80	25	A0000	8x8	640x200
F	Graphics	4	80	25	A0000	8x14	640x350
10	Graphics	16/256K	80	25	A0000	8x14	640x350
11	Graphics	2/256K	80	30	A0000	8x16	640x480
12	Graphics	16/256K	80	30	A0000	8x16	640x480
13	Graphics	256/256K	40	25	A0000	8x8	320x200

^aColors: Where two numbers are given, the first is the number of colors available at one time; the second number is the total number of possible colors. For mono modes this number refers to the number of attributes.

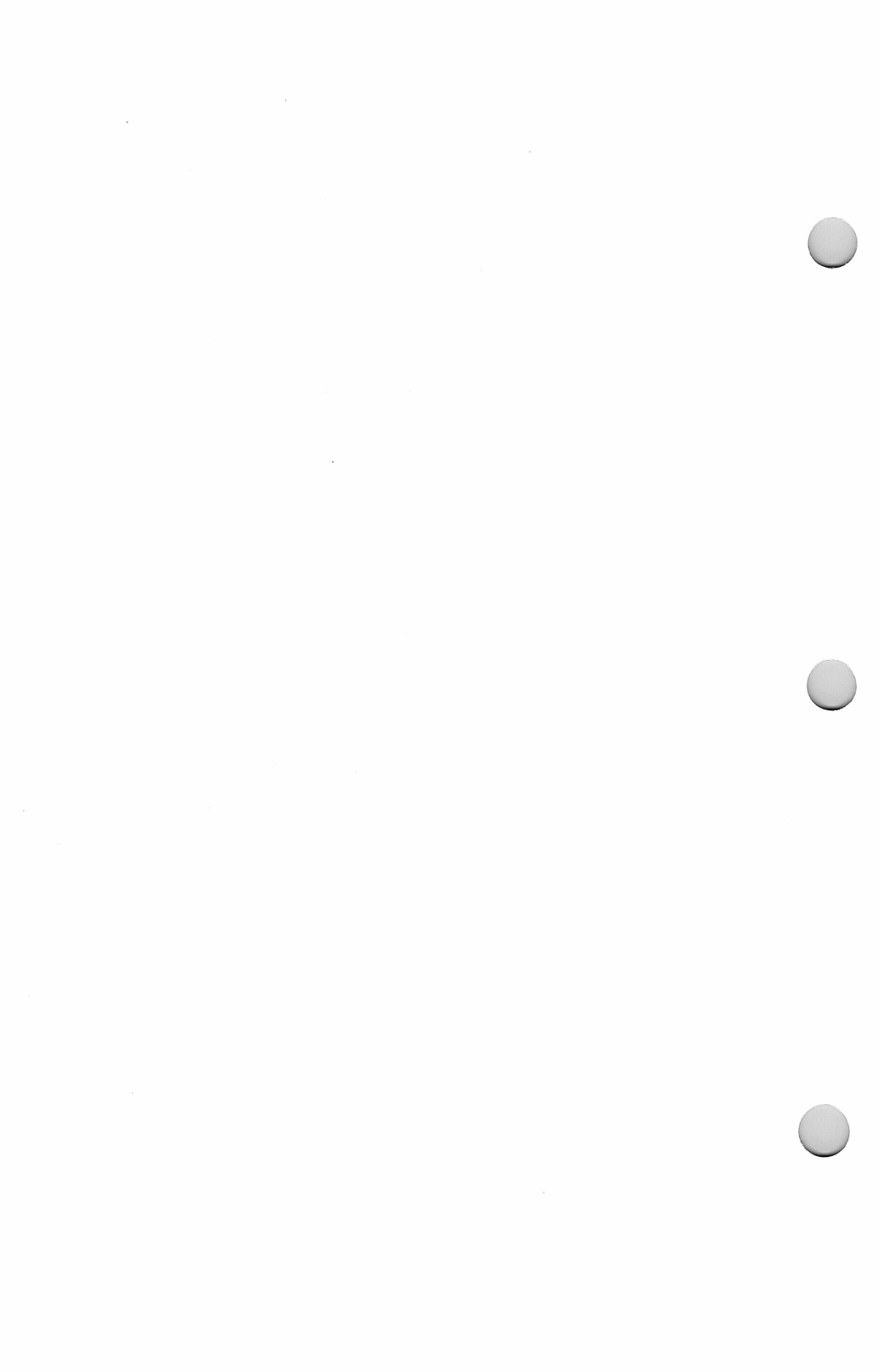
^bCharacter Size: The size of the matrix that contains each text character.

^cResolution: All 200-line modes are "double-scanned" to display 400 lines on screen.

^dEGA style text modes with 8 by 14 and 9 by 14 character sizes and 350 lines vertical resolution.

^eVGA style text modes with 9- by 16-character size and 400 lines vertical resolution.

NOTE: Default modes are 3+ for color monitors and 7+ for monochrome monitors.



Section 2

SETTING VGC SWITCHES AND JUMPERS

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CAUTION

Static electricity can damage board components.
Before handling the VGC board, safely discharge any
static buildup by touching the metal system unit
cover of your PC.

VGC SWITCHES AND JUMPERS

Figure 2-1 shows the locations of the switches and jumpers on the VGC board.

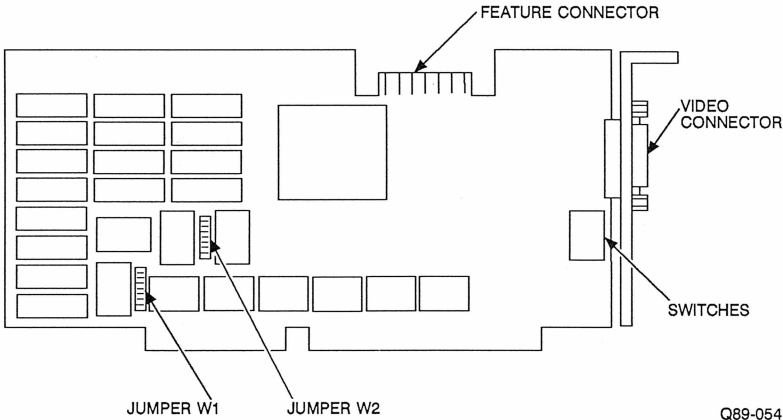


Figure 2-1. VGC Board Switch and Jumper Locations

Setting Switches

The switches located on the backplate of the VGC board allow you to set the VGC for use with various monitors. They are positioned so that you can reach them from the back of your PC after you have installed the VGC.

NOTE: If you reset the switches after the initial installation, you must power down or warm boot the system (by pressing Ctrl-Alt-Del) to activate the new settings.

You can set the switches to either ON or OFF. Find the correct settings for your particular configuration in Table 2-1, and set your VGC switches accordingly.

The settings for each switch are described on the following pages.

NOTE: Switch 3 is reserved for future use, and should remain set to the OFF position.

Table 2-1. Switch Settings (From Bottom to Top)

Switch Setting	Description
Switch 1	Monitor type
ON	Special multifrequency display timing
OFF	Standard PS/2 compatible fixed frequency display timing
Switch 2	VGA implementation type
ON	PS/2 style - all VGA modes available on any monitor (recommended setting)
OFF	PC/AT style - color modes on color monitors, mono modes on mono monitors
Switch 4	16-bit vs. 8-bit
ON	AutoSense - test and enable 16-bit memory and BIOS, if possible
OFF	Force 8-bit memory and BIOS operation

NOTE: For the Bull AP-X and APM PCs, Switch 4 must be set to the off position, if operation above 8 MHz is initiated.

Switch 1 Switch 1 tells the VGC to use special timing for a multifrequency monitor, or to use standard VGA timing for fixed frequency PS/2 monitors and some newer multifrequency displays.

This setting allows most video modes to be displayed on some brands of multifrequency monitors using a larger screen area than standard PS/2 timing allows. Some newer multifrequency monitors work better using the PS/2 monitor timing.

You may want to experiment with the two settings to determine the best results for your particular brand of multifrequency display.

NOTE: If you are using an IBM PS/2 display or equivalent fixed frequency display, you must select PS/2 compatibility display timing by setting switch 1 to the OFF position.

Switch 2 Switch 2 selects the manner in which the VGC handles switching between color and monochrome VGA modes. You normally want to set switch 2 to the ON position to select the PS/2 style VGA implementation.

Switch 3 For future use only. Must remain in the OFF position.

Switch 4 Setting switch 4 to the ON position allows you to use 16-bit BIOS and memory operation in PCs that have a 16-bit wide bus.

Setting the switch in the OFF position forces 8-bit BIOS and memory operation, regardless of the PCs bus width.

Setting Jumpers

Jumper W1: Manual 16-Bit BIOS Configuration

Jumper W1 enables your 16-bit VGC to use a 16-bit BIOS in systems that cannot support a 16-bit BIOS automatically with AutoSense.

Set this jumper over both pins for normal operation. Remove the jumper only if your system cannot use the 16-bit BIOS automatically, and only if there are no boards or devices in your system that use the memory in the range from C000 through DFFF.

If you set this jumper improperly, it may prevent your VGC and system from functioning properly.

Jumper W2: Feature Connector Clock Jumper

Jumper W2 allows the VGC to use the clock input from the Video Feature connector.

The factory setting (over the top two pins) supports 800 by 600 graphics and 132-column text modes. For normal operation, you should leave the Feature Connector Clock jumper in this setting.

The other position (over pins 2 and 3) disables 800 by 600 graphics and 132-column text modes, and provides full support for all of the signals on the Video Feature connector.

Feature Connector

The feature connector is reserved for future use, and is comparable to those found on the IBM VGA. The 26-pin feature connector is located along the top of the VGC, and supports add-on feature adapters made to enhance the VGC or the IBM VGA. (Refer to Table 2-2.)

Table 2-2. Video Feature Edge Connector Pinout

Front Pin (Component Side)	Function	Back Pin	Function
Y1	C0 (Color Bit 0)	Z1	Ground
Y2	C1 (Color Bit 1)	Z2	Ground
Y3	C2 (Color Bit 2)	Z3	Ground
Y4	C3 (Color Bit 3)	Z4	Select Internal Video
Y5	C4 (Color Bit 4)	Z5	Select Internal Syncs
Y6	C5 (Color Bit 5)	Z6	Select Internal DAC
Y7	C6 (Color Bit 6)	Z7	Not used
Y8	C7 (Color Bit 7)	Z8	Ground
Y9	DAC Clock	Z9	Ground
Y10	DAC Blanking	Z10	Ground
Y11	Ext. Horizontal Sync	Z11	Ground
Y12	Ext. Vertical Sync	Z12	Not used
Y13	Ground	Z13	Not used

Section 3 INSTALLING THE VGC

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Summary Follow the instructions in this section to install the VGC in your Bull PC. You can use these procedures in conjunction with your initial PC installation procedures.

TOOLS NEEDED

You may need one or more of the following tools when you install the VGC:

- Phillips screwdriver
- Medium flat-blade screwdriver
- Small flat-blade screwdriver.

INSTALLATION WITH A CO-RESIDENT CONTROLLER BOARD

You can install the VGC alone, or with a second Color Graphics or High-Resolution monochrome controller board.

There are two ways to install the VGC with a co-resident monitor controller board:

- With a High-Resolution monochrome controller co-resident, and the VGC configured as a Color Graphics controller.
- With a Color Graphics controller co-resident and the VGC configured as a High-Resolution monochrome controller.

Restrictions

You cannot install two similar controllers in the system at the same time. That is:

- You cannot configure the VGC as a High-Resolution monochrome controller with a co-resident High-Resolution monochrome controller in your system.
- You cannot configure the VGC as the Color Graphics controller or the Enhanced Video controller with a co-resident Color Graphics controller in your system.
- You cannot install the VGC with another VGC or an IBM EGA in the system.
- If the VGC is configured for Color Graphics and co-resides with a Hercules Graphics Card or a monochrome Graphics controller, you cannot configure the full graphics capabilities of these controller boards. Some diagnostics and software packages may have memory conflict problems.

Primary and Secondary Controllers

When you install the VGC with a second co-resident monitor controller, the VGC is the "primary" controller board, and the co-resident board is the "secondary" controller board.

The monitor attached to the primary controller is active when you power on your PC. The monitor attached to the secondary controller is inactive, until you use the DOS MODE command to activate it.

For example, if you have the VGC (primary controller) installed with a co-resident High-Resolution monochrome controller (secondary controller), the monitor attached to the VGC displays the DOS prompt when you power on the system. Anything you type is displayed on the VGC's monitor. The monitor attached to the High-Resolution monochrome controller is inactive.

NOTE: An exception is if you do not have a monitor connected to the VGC board, or if you use a multifrequency monitor that does not ground either pin 11 or 12 of the signal connector. In this case, the co-resident (non-VGC) controller becomes primary.

Changing the Primary Controller

In the previous example, you would use the following DOS MODE command to change the High-Resolution monochrome controller to the primary controller (the MODE.COM program must be in your current directory or path listing):

At the DOS prompt, type:

```
MODE MONO
```

and press Enter.

The MONO parameter sets the output to the High-Resolution MONOchrome monitor.

To reverse the procedure, and select the VGC as the primary controller, use the MODE command again, as follows:

At the DOS prompt, type:

```
MODE C080
```

and press Enter.

The C080 parameter sets the output color monitor (attached to the VGC) to 80 columns.

For more information on the MODE command, refer to the description of the command in your DOS manual.

PREPARING YOUR PC

Before you install the VGC:

- Power off and unplug the system unit, and any peripheral devices connected to it.

Make a note of the cable connections, so that you can easily reconnect them when you reassemble the system.

- Remove the cover from the system unit, according to the instructions in your PC owner's manual.

CAUTION

Static electricity can damage board components. Before handling boards or other system components, safely discharge any static buildup by touching the metal system unit cover of your PC.

Setting Processor Board Switches in Bull PCs

You may need to set switches on your PC's processor board, if you have not done so already.

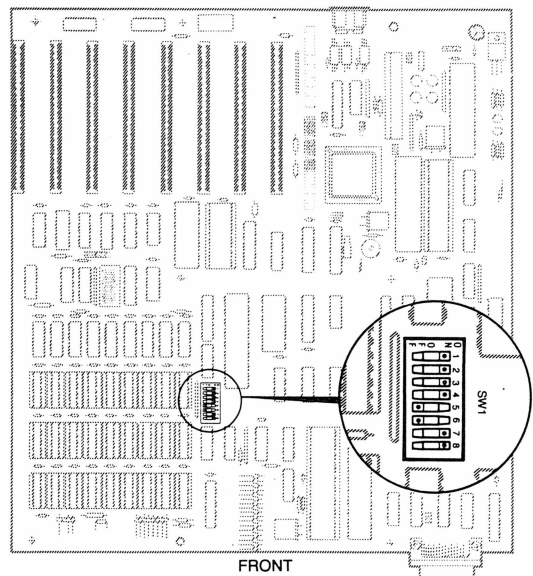
Refer to the following pages for instructions on setting the processor board switches on Bull XP, AP, or AP-X PCs.

For instructions on setting switches on other Bull PCs, refer to your PC owner's manual.

Also, refer to your owner's manual for information on running the SETUP or SETUPPC program, if applicable.

XP Series

Set the switches on switch block SW1 of your PC's processor board as shown in Figure 3-1.



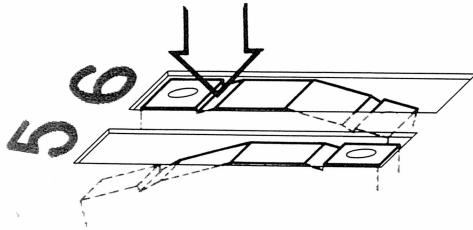
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Figure 3-1. Switch Block SW1

1. Set switch 2 of switch block SW1 as follows:

- a. If there is no 8087 coprocessor installed in your PC, set switch 2 to ON.
- b. If there is an 8087 coprocessor installed in your PC, set the switch to OFF.

If the switches on switch block SW1 are rocker-style switches, use a ball-point pen to change their positions (as shown by the arrow in the switch detail below). DO NOT use a pencil; graphite pieces could break off into the switch block.



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When you set a switch, the indicator dot at the opposite end of the switch will show.

2. Set switches 5 and 6 of switch block SW1 to the ON position for no display.

AP Series with SETUP or SETUPPC Program

If you have not already done so, set the Primary Monitor selection switch for the Color Graphics setting, as shown in Figure 3-2.

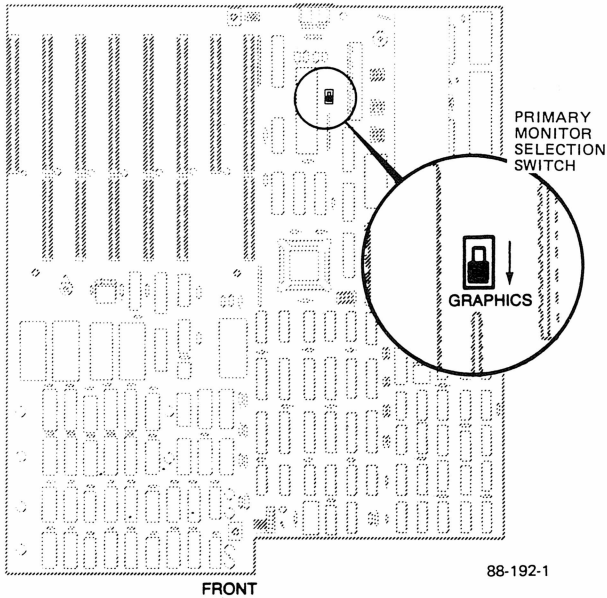


Figure 3-2. AP System Unit Board

In addition, Bull supplies AP owners with a SETUP or SETUPPC program. The program displays a menu that allows you to configure the AP for the type of monitor you are using. Use the program to configure your AP for the VGC. Refer to your AP owner's manual for more detailed instructions.

NOTE: If you configured the VGC for a High-Resolution monochrome monitor, the SETUP or SETUPPC menu lists:

EGA/VGA graphics display

as your monitor type.

AP-X Series with SETUP or SETUPPC Program

Set the Primary Display switch on the AP-X processor board to the Color setting, as shown in Figure 3-3.

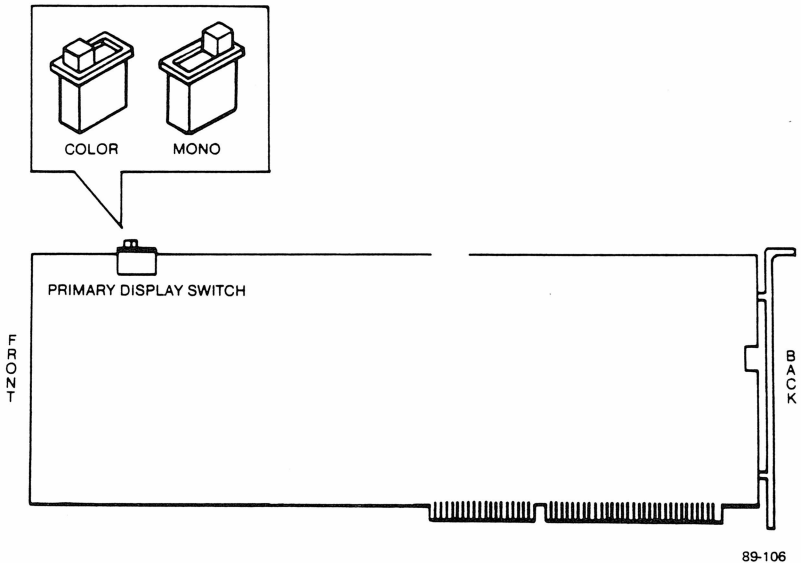


Figure 3-3. AP-X Primary Display Switch

In addition, Bull supplies AP-X owners with a SETUP or SETUPPC program. The program displays a menu that allows you to configure the AP-X for the type of monitor you are using. Use the program to configure your AP-X for the VGC. Refer to your AP-X owner's manual for more detailed instructions.

NOTE: If you configured the VGC for a High-Resolution monochrome monitor, the SETUP or SETUPPC menu lists:

EGA/VGA graphics display
as your monitor type.

Setting Processor Board Switches in IBM PCs

Before you install the VGC, you need to set the switches on your PC's processor board, if you have not done so already.

Refer to the following pages for instructions on setting processor board switches on IBM PC, XT, and AT PCs.

IBM PC

Coprocessor Switch

Set the coprocessor switch on the processor board to the correct position. If there is no 8087 coprocessor installed in your PC, you must set the switch for NO 8087.

Check your PC owner's manual for instructions on setting this switch.

Switch Block 1

Set switches 5 and 6 on switch block 1 to the ON position, as shown in Figure 4-1.

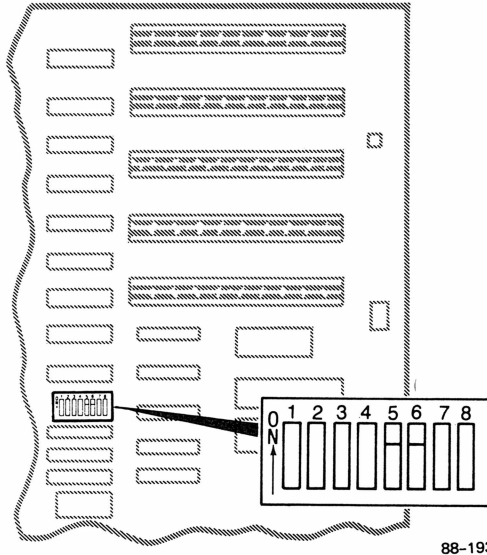


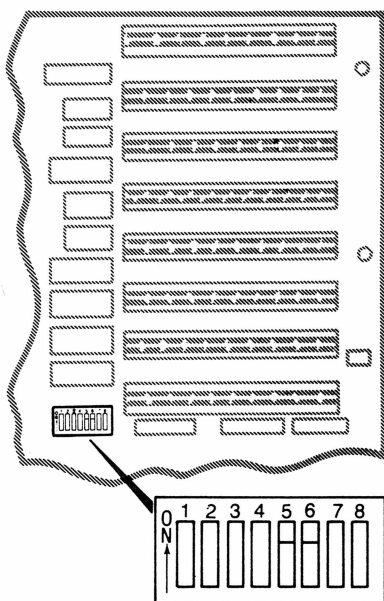
Figure 4-1. PC Processor Board Switch Block 1

PC/XT

Coprocessor Switch Set the coprocessor switch on the processor board to the correct position. If there is no 8087 coprocessor installed in your PC, you must set the switch for NO 8087.

Check your PC owner's manual for instructions on setting this switch.

Switch Block There is only one switch block on the PC/XT processor board (Figure 4-2). Set switches 5 and 6 to the ON position.



88-196

Figure 4-2. PC/XT Processor Board Switch Block

PC/AT with SETUP Program

If you have not already done so, set the Primary Display switch on the PC/AT processor board to the Color Display Setting, as shown in Figure 4-3.

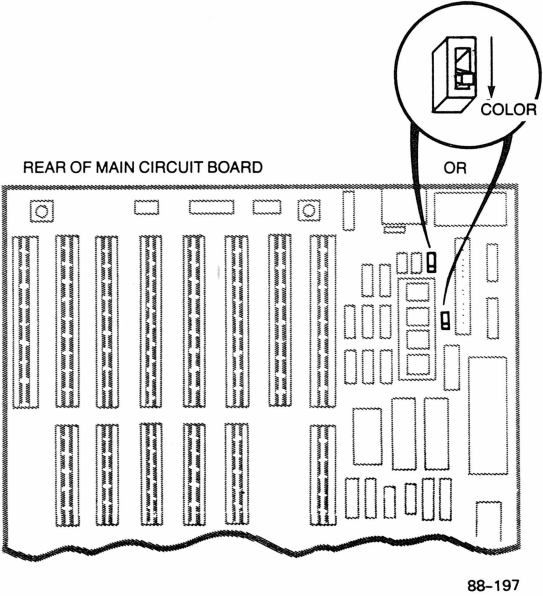


Figure 4-3. PC/AT Primary Display Switch

In addition, IBM supplies PC/AT owners with a Diagnostics diskette. The diskette contains a menu-driven SETUP program that allows you to configure the PC/AT for the type of monitor you are using. Use the program to configure your PC/AT for the VGC. You may want to check your *PC/AT Guide To Operations* at this point.

NOTE: If you configured the VGC for a High-Resolution Monochrome monitor, the SETUP menu lists:

MONOCHROME DISPLAY

as your monitor type.

If you configured the VGC for a Color monitor or Enhanced Color monitor, the SETUP menu lists:

COLOR DISPLAY

as your monitor type.

INSTALLING THE VGC

After you have set the processor board switches, use the following procedures to install the VGC into your PC.

NOTE

In PCs where 16-bit expansion slots are available, you should install the VGC in these slots. Set switch 4 on the VGC to the ON position.

1. Find an empty expansion slot for the VGC.
 - a. Remove the screw that secures the expansion slot cover. Save the screw to be used in the procedures below.
 - b. Remove the expansion slot cover and store it.
2. Hold the VGC firmly by its top edge, and press it into the expansion slot until the gold edge connector is secure in the slot.
3. Line up the board's backplate with the screw hole in the backplate of the system unit.
4. Using the screw that you removed in step 1, secure the backplate of the VGC to the system unit.
5. Replace the system unit cover, as described in your PC owner's manual.
6. Attach the VGA monitor cable to the VGC's 15-pin connector.

CAUTION

Be sure that you have properly set the VGC switches for the monitor you are connecting. If the switches are set for the wrong monitor type, your monitor could be damaged.

You can now:

- If necessary, refer to Section 4 for instructions on using the emulation modes supported by your VGC.

Section 4 also describes how to use the Screen Saver utility.

- Refer to Appendix B for instructions on running the VGC diagnostics program to check the installation of your VGC.



Section 4

USING EMULATION MODES AND SCREEN SAVER UTILITY

In this section:	See page
Introduction.....	5-2
The VGA.EXE Emulation Mode Program.....	5-2
Hercules Graphics Emulation.....	5-6
The Screen Saver Utility.....	5-7
Using Screen Saver Commands in Batch Files.....	5-8
Creating Batch Files.....	5-8
The AUTOEXEC.BAT File.....	5-10

INTRODUCTION

The Video Graphics Controller Utilities diskette shipped with your VGC board contains the VGA.EXE and SCR.COM programs.

The VGA.EXE program allows you to activate the emulation modes of the VGC board.

The SCR.COM program allows you to use the Screen Saver utility.

NOTE: Make a backup copy of the VGC Utilities diskette as a work copy, and store the master diskette in a safe place.

THE VGA.EXE EMULATION MODE PROGRAM

Some software programs require a Color Graphics controller (CGC) or Hercules Graphics card (HGC). You can use the VGA.EXE program to configure your VGC to emulate either of these controllers:

- Color Graphics Emulation

Sets up the VGC to be compatible with Color Graphics Controller software.

- Hercules Emulation

Sets up the VGC to be compatible with Hercules graphic software.

You only need to run the VGA.EXE program if you want to run programs that make direct access to the CGC or HGC controller registers (or ports). With the exception of VGC-compatible software, most of the newer programs written after the VGA was introduced, do not require you to use the VGC program emulation modes.

Before you run the VGA.EXE program, try running your most frequently used software to see if it is necessary for you to use the CGC or HGC emulation modes.

If you do need to use the VGA.EXEC program, be sure that the following conditions exist:

1. You have installed the VGC according to the procedures in this guide.
2. You have a copy of the VGA.EXE program in your current drive or DOS path (refer to your DOS manual for information about using paths).
3. You are using the correct monitor for the monitor controller you intend to emulate. For example, if you have the VGC connected to a monochrome monitor, do not issue a command to configure the VGC to emulate the Enhanced VGA Color monitor.

To run the VGA.EXE program:

1. At the DOS prompt, type:

VGA

and press Enter. The Special Features Utility menu (Figure 4-1) appears.

```
VGA CARD Special Features Utility
P.N.XXXXXX-XXX BIOS Version XX/XX/XX-18:00:00
BIOS Part Number XXXXXX-XXX
```

```
Exit to DOS
Switch to VGA Color
Switch to VGA Monochrome
Set CGA Mode
Set MDA Mode
Set Hercules Half Mode
Set Hercules Full Mode
Reboot System in Current Mode
Lock the Current Mode
```

```
Use the UP and DOWN arrows to move around
and the Enter key to select an item
```

Figure 4-1. Special Features Utility Menu

To select an emulation mode, use the UP and DOWN arrow keys to move the cursor to the desired mode, and press Enter.

Table 4-1 describes the Emulation mode commands listed on the Special Features Utility menu.

Table 4-1. Emulation Mode Commands (1 of 2)

Command	Function
EXIT TO DOS	Exits to DOS with no commands entered. The DOS prompt appears.
SWITCH TO VGA COLOR	Changes the board to color mapping as needed. Allows board to use video modes that require color mapping.
SWITCH TO VGA MONOCHROME	Changes the board to monochrome mapping as needed. Allows you to use video modes that use monochrome mapping, such as monochrome text mode.
SET CGA MODE	Sets the VGC to mode 0. Compatible with CGA resolution. (VGA color monitor only.)
SET MDA MODE	Sets the VGC to mode 7. Compatible with all other non-VGA monochrome modes.
SET HERCULES HALF MODE	Sets the VGC to operate in the first graphic page (B0000-B7FFF) of available memory.
SET HERCULES FULL MODE	Sets the VGC to operate in both graphic pages (B0000-B7FFF, B8000-BFFFF) of available memory.
REBOOT SYSTEM IN CURRENT MODE	Does a "warm" boot of the system, enabling the configuration you have selected. NOTE: Before selecting this option, remove the Utilities diskette from drive A. The system cannot boot from the Utilities diskette.

Table 4-1. Emulation Mode Commands (2 of 2)

Command	Function
LOCK THE CURRENT MODE	Locks the current mode so that it will survive a warm boot. Can be used in conjunction with another parameter to lock that particular mode. For example, VGA CGA LOCK allows the board to survive a reboot with the board configured as a Color Graphics adapter. Any specific video mode command such as VGA CGA unlocks the board unless you use it with the LOCK parameter. If you make a mistake typing the VGA command, the program gives you the option of using the VGA menu or returning to DOS.

NOTE: When you configure the VGC to emulate a Color Graphics controller, it must be connected to a VGA color monitor.

Hercules Graphics Emulation

The Hercules Graphics Card (HGC) has 64 KB of memory for graphics use, divided into two pages of graphics memory.

The Special Features Utility menu contains two options that allow you to configure the VGC to run software that uses HGC graphics capabilities:

- Set Hercules Full Mode:

In Full mode the VGC uses the full amount of memory (both graphic pages, each of 32 KB memory). Some software requires the use of Full mode.

NOTE: Full mode does not allow you to use a co-resident Color Graphics controller.

- Set Hercules Half Mode:

In Half mode, the VGC uses only half of the memory (one graphic page of 32 KB memory).

This allows you to install a co-resident Color Graphics controller with the VGC (in Hercules emulation mode) in another slot.

Monochrome output is directed through the VGC, while color output is directed through the Color Graphics controller.

In Half mode, the co-resident Color Graphics controller must be attached to a color monitor or enhanced color monitor.

THE SCREEN SAVER UTILITY

You can use the Screen Saver utility to automatically shut off your screen display if you are away from your PC for long periods of time. This helps extend the life of your screen, reducing the chance of images being "burnt" into the screen.

To use the Screen Saver utility, you need a copy of the SCR.COM program in your current drive or DOS path listing (refer to your DOS manual for information about using the path listing).

To use the Screen Saver utility, type a Screen Saver command at your DOS prompt, and press Enter. Table 4-2 describes the Screen Saver commands.

Table 4-2. Screen Saver Commands

Command	Description
SCR ON	Shuts off your screen display if the keyboard has not been used for 5 minutes (the default time).
SCR n	Shuts off your screen display if it has not been used in a specified amount of minutes (signified by n in the following example). As an example, the following command turns the screen display off after 15 minutes: SCR 15
SCR OFF	Disables the Screen Saver utility. Use this command if you will not be pressing keys for an extended period of time, such as when you are using a mouse.
SCR S	Displays the current status of the Screen Saver utility.
SCR ?	Displays a list of the Screen Saver options.

NOTE: The Screen Saver utility was designed exclusively for use with Bull video controller cards. Bull is not responsible for damage to your PC or monitor caused by incorrect use of the Screen Saver utility.

Using Screen Saver Commands in Batch Files

A batch file gives you the ability to run a series of commands automatically, as though you were typing them one at a time at the DOS prompt.

By using a batch file, for example, you could easily include Screen Saver commands in a series of frequently used commands.

Batch files have the .BAT extension (such as SAMPLE.BAT) to differentiate them from other files.

Creating Batch Files

There are two basic ways to create a batch file.

- You can use a text editor that writes standard ASCII text files (such as WordStar in the Non-Document mode, or the DOS editor, EDLIN).
- You can write a batch file directly from the DOS prompt using the DOS COPY command with the CON parameter.

Example

If you have never created a batch file, you may want to try the following example. The example batch file is written using the DOS COPY command. You can also create this file with a text editor if you prefer.

For this example, you should have a copy of the SCR.COM program in your current drive or DOS path (refer to your DOS manual for information about using paths).

1. At the DOS prompt, type the following lines exactly as shown, and press Enter at the end of each line:

```
COPY CON: SAMPLE.BAT
CLS
SCR ON
```

2. To save this information on your diskette, press Function Key F6 (or press Ctrl-Z) and then press Enter. The DOS prompt appears.

Type DIR to display a directory listing. The file SAMPLE.BAT is now included in the list.

3. At the DOS prompt type:

```
SAMPLE
```

and press Enter.

Each line in the SAMPLE.BAT file is invoked as follows:

```
CLS
```

(The DOS command for Clear Screen)

```
SCR ON
```

(The Screen Saver utility is turned on)

Now, when you wish to clear your screen and invoke the SCR ON command, you can type SAMPLE at the DOS prompt, and press Enter. The commands are executed for you automatically.

Once you know how to write a batch file, you can create one that best suits your needs. Just about anything you can enter at the DOS prompt can be included as a line in your batch file.

The AUTOEXEC.BAT File

By creating an AUTOEXEC.BAT file you can have your PC configure itself automatically, each time you power it on. The AUTOEXEC.BAT batch file AUTOMATICALLY EXECUTES your commands when you power on your system.

NOTE: If your system already has an AUTOEXEC.BAT file, refer to your DOS manual for information on how to add commands.

Example

The following example assumes that you are a Lotus 1-2-3 user who has already configured Lotus 1-2-3 to work with a Color Graphics controller driver.

The example shows you how to create an AUTOEXEC.BAT file to do the following:

- Display the DATE and TIME prompts.
- Turn the Screen Saver utility on.
- Invoke Lotus 1-2-3.

The example uses the DOS COPY command again to create the AUTOEXEC.BAT file. You can use a text editor if you prefer.

This example assumes that you are in the root directory of drive C. You could, however, create an AUTOEXEC.BAT file on your DOS system diskette.

Since this AUTOEXEC.BAT file automatically loads Lotus 1-2-3, use the Lotus Boot diskette, with a copy of SCR.COM on it.

1. At the DOS prompt, type the following lines exactly as shown, and press Enter at the end of each line:

```
COPY CON: AUTOEXEC.BAT
DATE
TIME
SCR ON
123
```

2. To save this information to your disk, press Function Key F6 (or press Ctrl-Z), and then press Enter. The DOS prompt appears.

Type DIR to display a directory listing. The file AUTOEXEC.BAT is now included in the list.

Now, when you boot this disk, the AUTOEXEC.BAT file you just created will be invoked as follows:

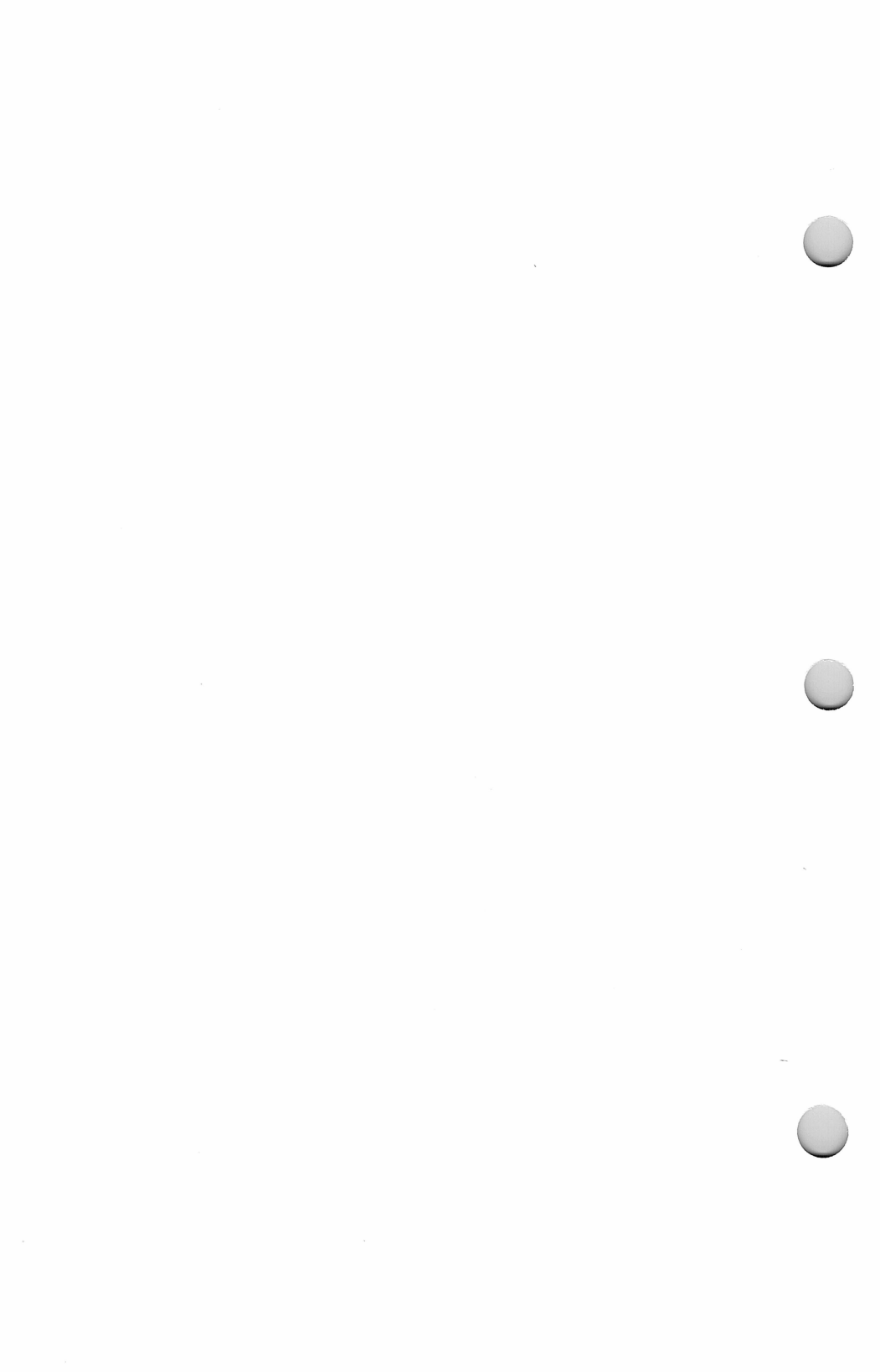
```
DATE
(Enter a new system date)

TIME
(Enter a new system time)

SCR ON
(The Screen Saver utility is turned on)

123
(Invoke Lotus 1-2-3)
```

Refer to your DOS manual for more information about batch files.



Appendix A

TROUBLESHOOTING

In this appendix:	See page
General Procedures.....	A-2
Cable Compatibility and Pinout Information.....	A-3

GENERAL PROCEDURES

If you are experiencing difficulty with the VGC, follow these procedures:

1. Make sure that the VGC is seated firmly in its expansion slot, and that it is not touching against other boards in your system.
2. Check your monitor cable to ensure that it is properly connected to the VGC, and that it has the proper pinout configuration, as described later in this appendix.
3. Make sure that your PC is either a Bull PC or an IBM PC.
4. Check your PC's switch settings, as well as those on the VGC, to ensure that all settings are correct for the type of configuration you are operating.
5. Check your software. The VGC can emulate different controllers. Be sure you are using the correct type of software for the controller your VGC is emulating.
6. Check your monitor. The VGC can work with two different monitor types. Be sure you have the VGC configured for the monitor you are using.
7. Make sure that you are using the correct VGA.EXE emulation mode commands.

CABLE COMPATIBILITY AND PINOUT INFORMATION

The VGC comes with a 15-pin cable connector, commonly referred to as a DE-15 connector. Your monitor cable must also have a cable with a DE-15 connector. Each of the 15 pins have different functions, depending on the type of display you are emulating.

Pin	Function	Notes
1	R	Red
2	G	Green
3	B	Blue
4	None	No pin
5	Self Test	Grounded by controller
6	None	Dummy pin
7	R Return	Return
8	G Return	Return
9	B Return	Return
10	Digital Ground	Return for sync, sense, and self test.
11	Mono Sense	Grounded at monitor
12	Color Sense	Grounded at monitor
13	Horizontal Sync	
14	Vertical Sync	
15	None	No pin

Pins 11 and 12 are sensed by the VGC, depending on whether there is a color or monochrome monitor attached.

Appendix B

RUNNING THE VGC DIAGNOSTICS PROGRAM

In this appendix:	See page
Running the Diagnostics Program.....	B-2
If You Use a VGA Color Monitor.....	B-3
If You Use a VGA Monochrome Display.....	B-14
Problem Checklist.....	B-17

Summary This appendix provides instructions on running the Diagnostics program, DIAG.EXE, on your VGC Utilities Diskette. The program can help you to analyze problems if they occur with your VGC.

RUNNING THE DIAGNOSTICS PROGRAM

The diagnostics program (DIAG.EXE), located on the VGC Utilities diskette, leads you through a series of screens according to the type of monitor you are using.

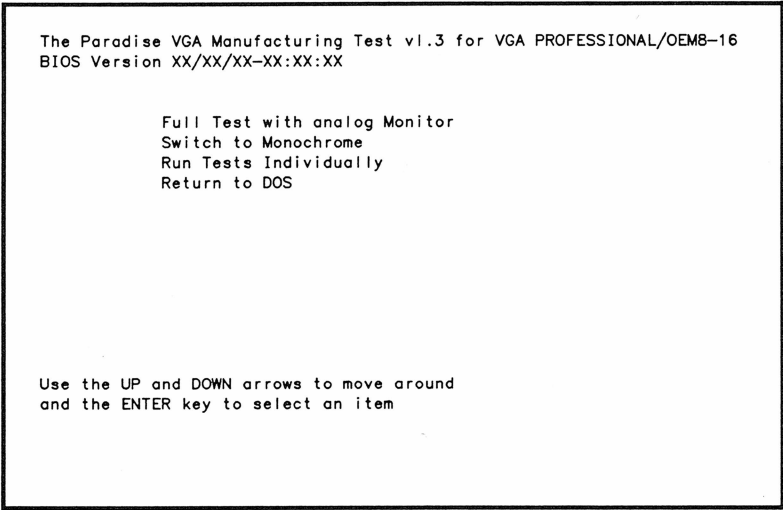
The following instructions assume that you have a copy of the DIAG.EXE program in your current drive or DOS path (refer to your DOS manual for information about using paths).

To run the program, at the DOS prompt type:

DIAG

and press Enter.

The Diagnostic Main Menu (Figure B-1) appears.

A screenshot of the Diagnostic Main Menu, enclosed in a rectangular border. The text is as follows:

The Paradise VGA Manufacturing Test v1.3 for VGA PROFESSIONAL/OEMB-16
BIOS Version XX/XX/XX-XX:XX:XX

Full Test with analog Monitor
Switch to Monochrome
Run Tests Individually
Return to DOS

Use the UP and DOWN arrows to move around
and the ENTER key to select an item

Figure B-1. Diagnostics Main Menu

If You Use a VGA Color Monitor

If you are using the Bull VGA Color monitor, follow these steps from the Diagnostics Main Menu:

1. Select Full Test with analog Monitor. The following message is displayed if there are no video memory problems:

Card VIDEO MEMORY is 256 KB

2. Press Enter. The following is displayed for the Switch Test:

sw1.1=off, - PS/2 MONITOR

sw1.2=on, - PS/2 BIOS

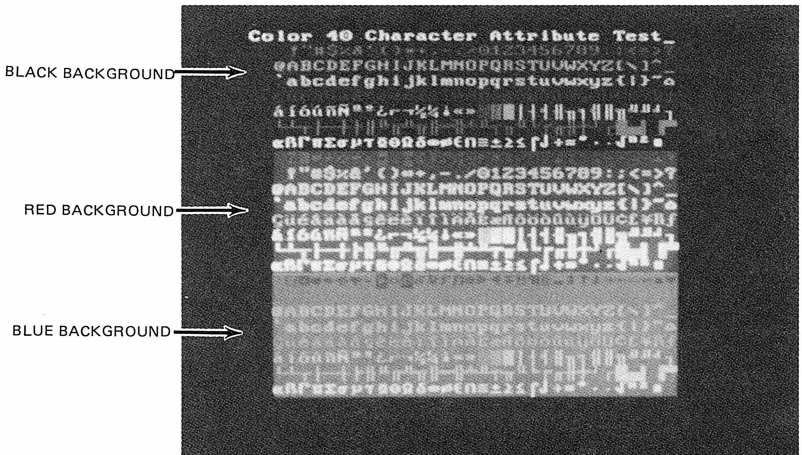
sw1.3=x, - DO NOT CARE

sw1.4=on, - 16 BIT SET

Card is set for 16 bit BIOS

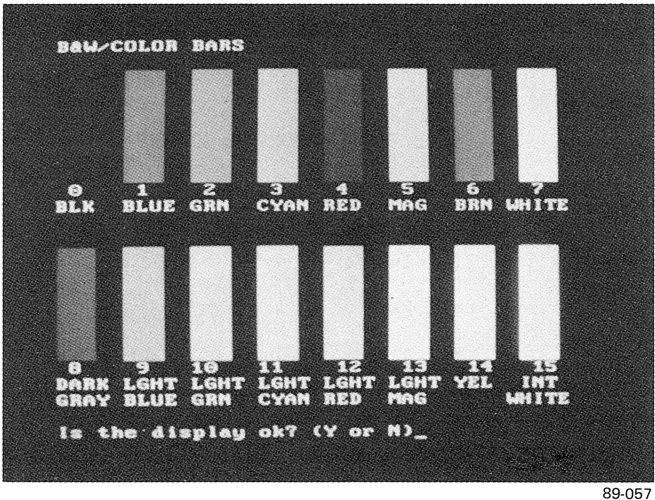
Card is set for 16 bit VRAM

3. Press Enter. The following screen appears for the Color 40-Character Attribute Test:



89-056

4. Press Enter. The following screen appears, showing color bars.

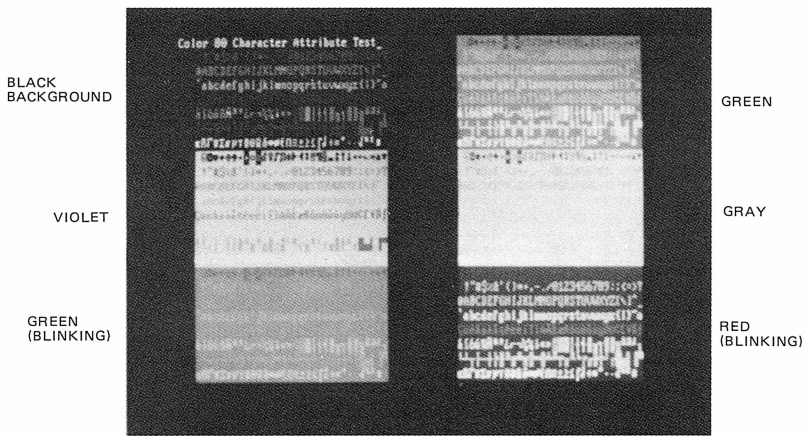


Enter a Y (for Yes) if the names under each color bar correspond to the color of the bar, and press Enter. Enter an N if the colors are incorrect, and press Enter.

If you answer Y, the following message appears:

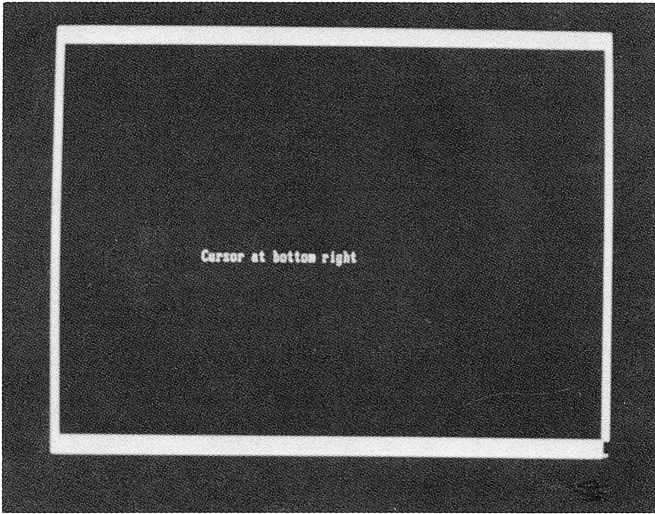
test passed

5. Press Enter. The following screen for the Color 80 Character Attribute Test appears:



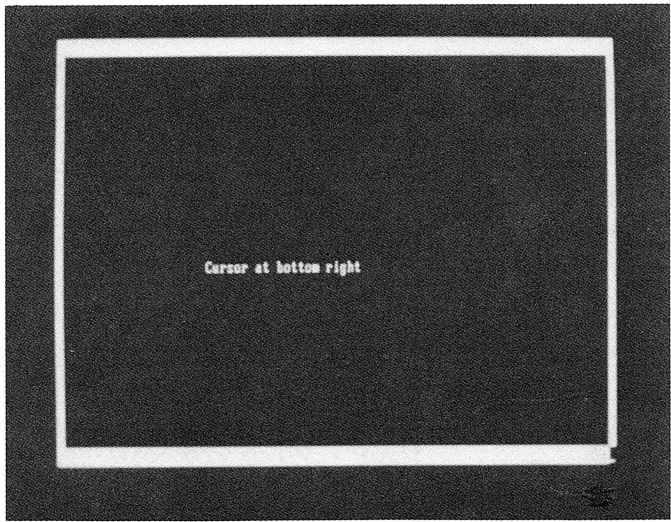
89-058

6. Press Enter. The following 80 X 25 Cursor Format Test screen appears:



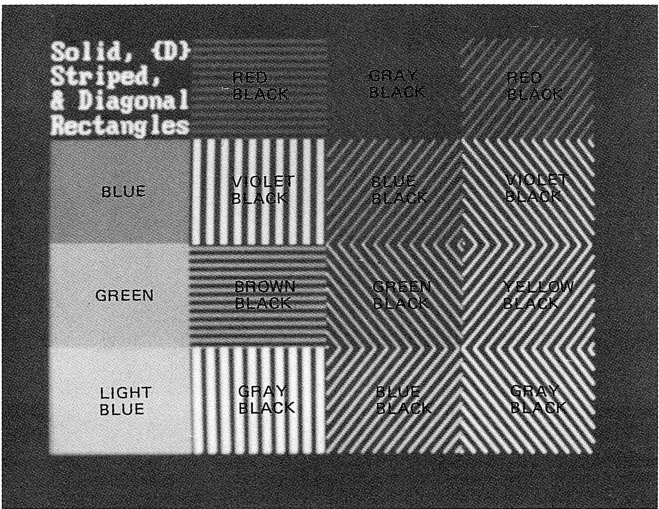
89-060

7. Press Enter. The following 40 X 25 Cursor Format Test screen appears:



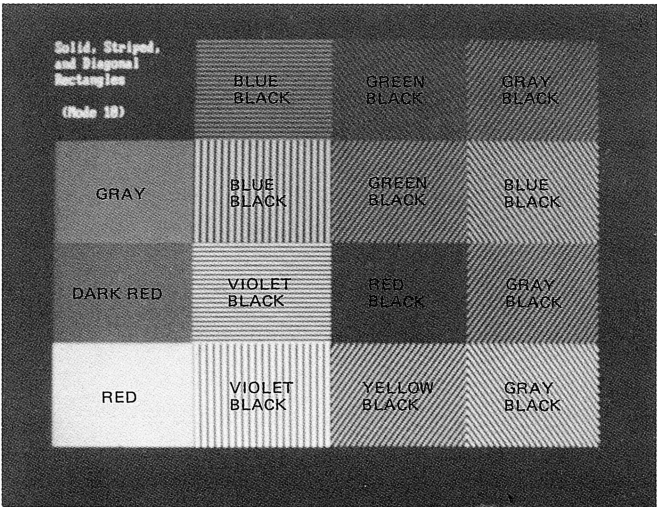
89-060

8. Press Enter. The following color screen appears, showing solid, striped, and diagonal rectangles (Mode D, 40 X 25 format):



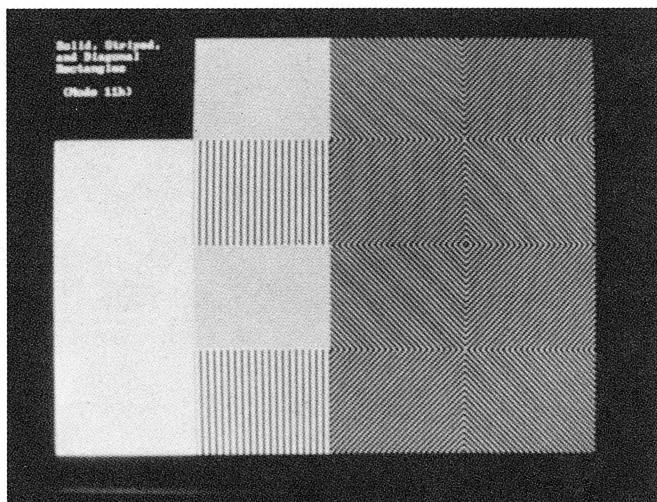
89-061

9. Press Enter. The following color screen appears, showing solid, striped, and diagonal rectangles (Mode 10, 80 X 25 format):



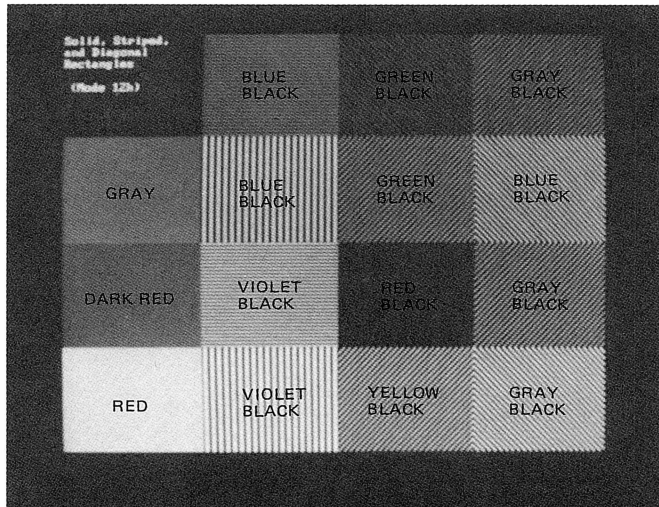
89-070

10. Press Enter. The following black and white screen appears, showing solid, striped, and diagonal rectangles (Mode 11, 80 X 25 format):



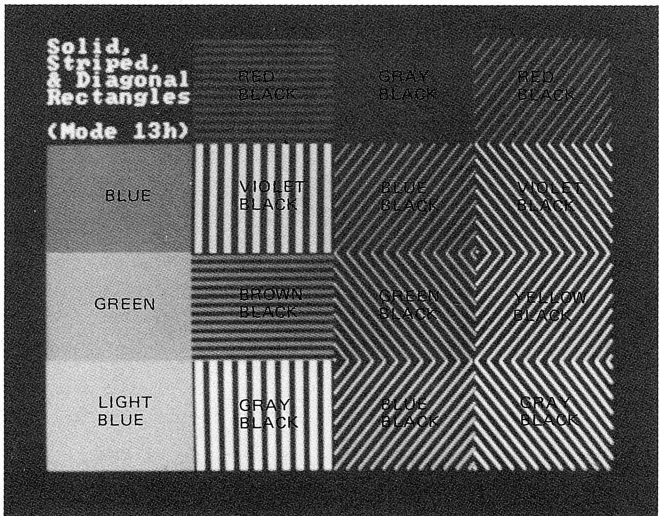
89-071

11. Press Enter. The following color screen appears, showing solid, striped, and diagonal rectangles (Mode 12H, 80 X 25 format):



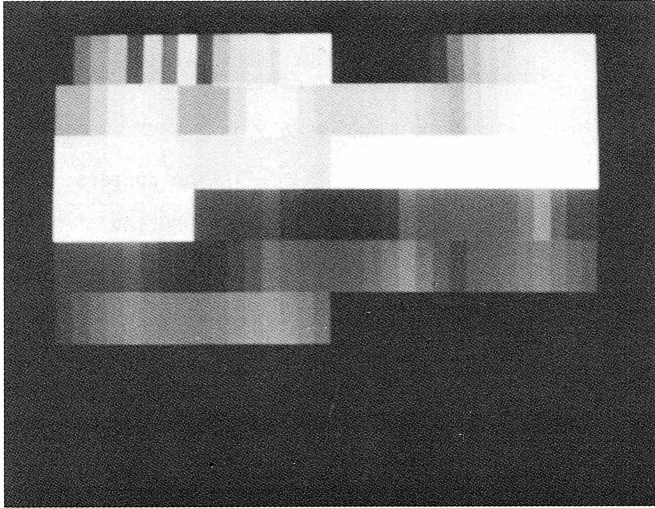
89-072

12. Press Enter. The following color screen appears, showing solid, striped, and diagonal rectangles (Mode 13, 40 X 25 format):



89-073

13. Press Enter. The following 256-color bar screen appears:



89-074

14. Press Enter. The following message appears:
- Auto Tests Complete**
15. Press Enter. The Diagnostics Main Menu appears.
16. Select Return to DOS. The DOS prompt appears.

If You Use a VGA Monochrome Display

If you are using the Bull VGA Monochrome monitor, follow these steps from the Diagnostics Main Menu:

1. Select Full Test with analog Monitor. The following message is displayed if there are no video memory problems:

Card VIDEO MEMORY is 256 KB

2. Press Enter. The following appears:

sw1.1=off, - PS/2 MONITOR

sw1.2=on, - PS/2 BIOS

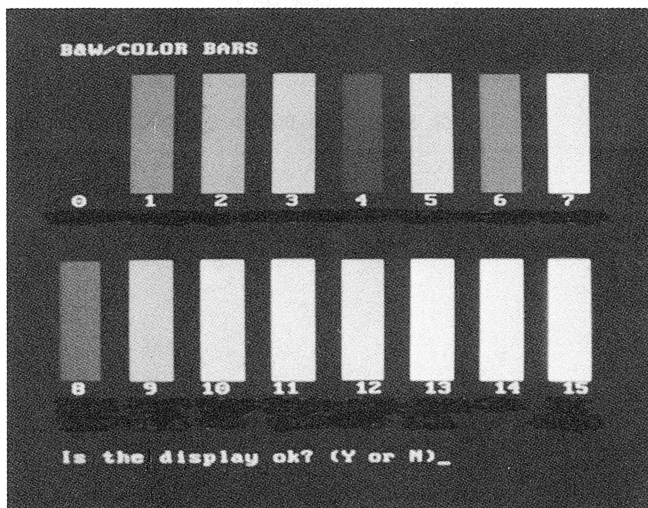
sw1.3=x, - DO NOT CARE

sw1.4=on, - 16 BIT SET

Card is set for 16 bit BIOS

Card is set for 16 bit VRAM

3. Press Enter. The following screen appears, showing black and white color bars:



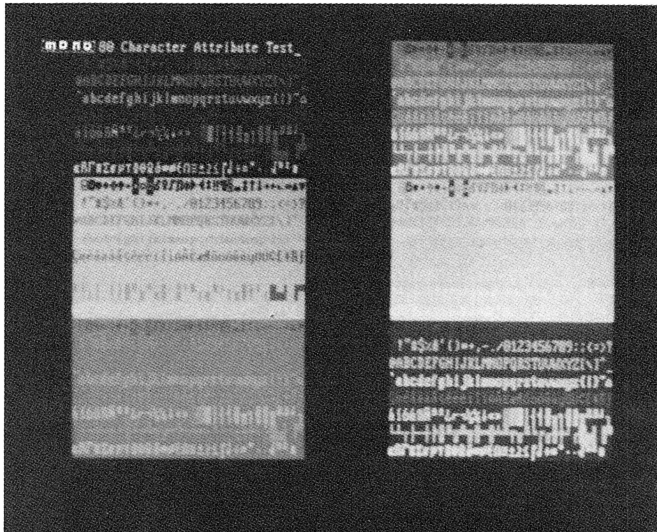
89-077

4. Press Y (for Yes) if the screen is correct, and N if the screen is incorrect, and then press Enter.

If you answer Y, the following message appears:

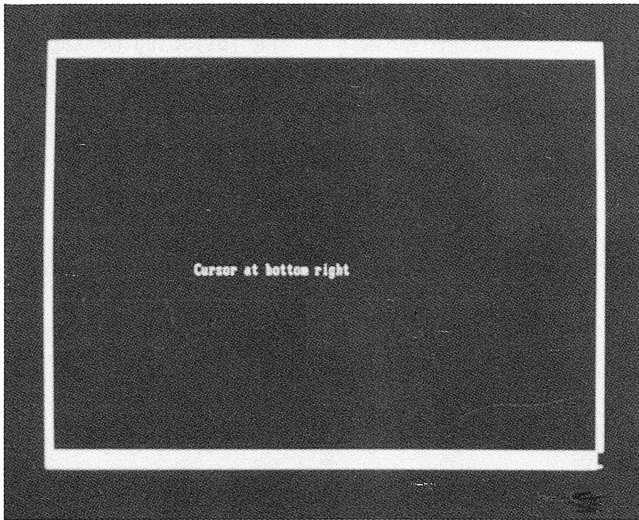
test passed

5. Press Enter. The following Mono 80 Character Attribute Test screen appears:



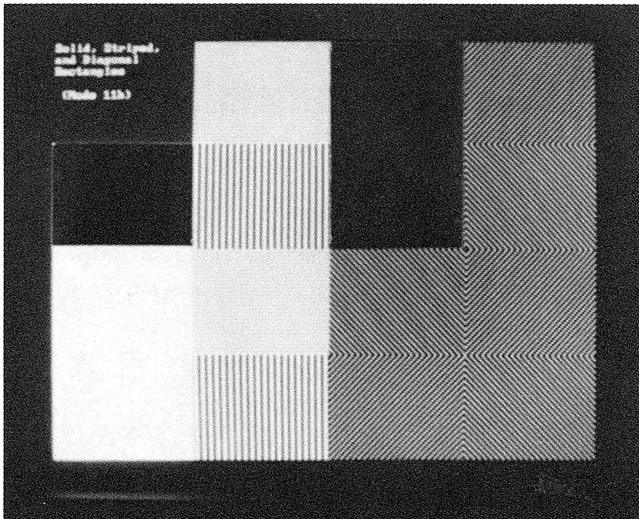
89-078

6. Press Enter. The following 80 by 25 Format Test screen appears:



89-060

7. Press Enter. The following screen showing solid, striped, and diagonal rectangles (Mode 0FH) appears:



89-081

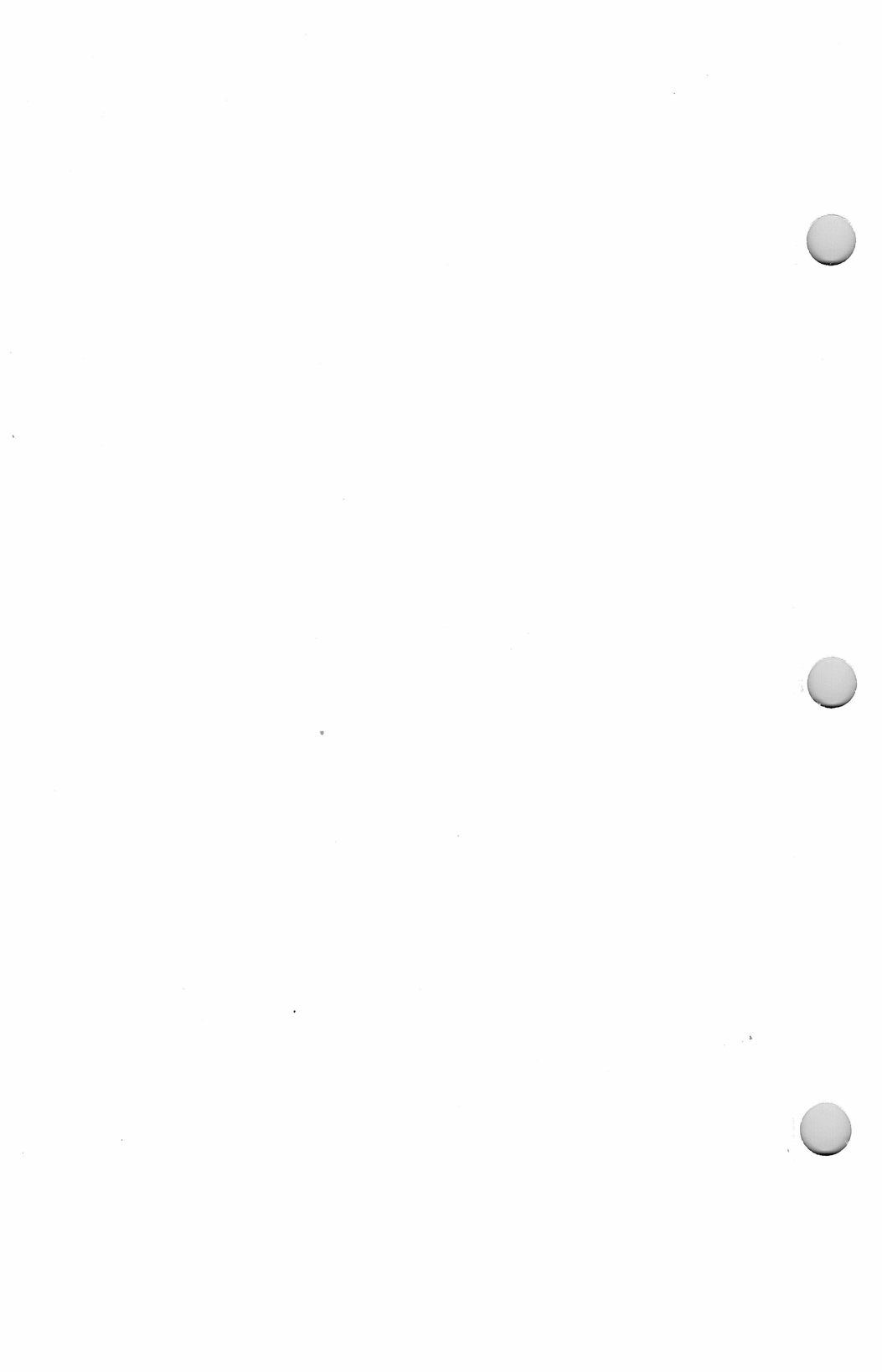
8. Press Enter. Another screen appears, showing solid, striped, and diagonal rectangles.
9. Press Enter. The following message appears:

Auto Tests Complete
10. Press Enter. The Diagnostics Main Menu appears.
11. Select Return to DOS. The DOS prompt appears.

PROBLEM CHECKLIST

If the Diagnostics program indicates a problem, follow the procedures in the Problem Checklist below.

1. Power off the PC. You may need to reset switches on the VGC or on the PC's processor board.
 - a. Check your VGC switches. The program may be diagnosing a feature according to your switch setup.
 - b. Check the switch settings on your PC's processor board. Refer to Section 3 for the type of PC you are using.
2. Check your connections. Be sure that the VGC is seated firmly in the expansion slot. Also, check that you are using the correct cable, and that it is connected properly.
3. Run the Diagnostics program again. If problems still occur, consult your Bull Marketing representative.



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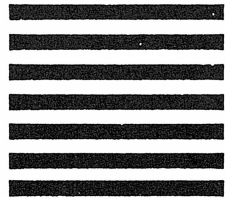
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